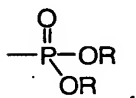


Claims

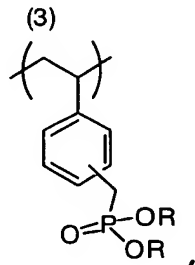
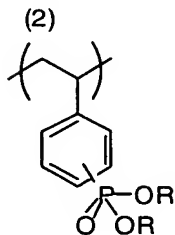
1. A copolymer containing at least two or more polymer segments, where at least one polymer segment contains a phosphoryl derivative represented by the following general formula (1) and at least one polymer segment never contains a phosphoryl derivative represented by the following general formula (1):

(1)



where R independently represents hydrocarbon, an aromatic ring, hydrogen, a metal ion or onium ion.

2. A copolymer according to claim 1, where the polymer segment containing the phosphoryl derivative contains at least one or more polymerization units selected from the general formulas (2) and (3):



where R independently represents hydrocarbon, an aromatic ring, hydrogen, a metal ion or onium ion.

3. A copolymer according to claim 1 or 2, the copolymer being a block copolymer.

4. A copolymer according to claim 3, where at least one polymer segment never containing the phosphoryl derivative is a polystyrene derivative.

5. A copolymer according to claim 1 or 2, the copolymer being a graft copolymer.

6. A copolymer according to any of claims 1 through 5, where the phosphoryl derivative is phosphonic acid or a salt thereof.

7. A copolymer according to any of claims 1 through 6, the copolymer being synthetically prepared by radical polymerization.

8. A composition containing a copolymer according to any of claims 1 through 7.

9. An ion exchanger comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

10. An ion adsorbent comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

11. A polymeric electrolyte comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

12. An ion conductor comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

13. A proton conductor comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

14. An ion exchange membrane for fuel cell, the ion exchange membrane comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

15. A fuel cell using a copolymer according to any of claims 1 through 7, a composition according to claim 8 or an ion exchange membrane according to claim 14.

16. An electrochemical device using a copolymer according to any of claims 1 through 7, a composition according to claim 8 or an ion exchange membrane according to claim 14.

17. A molded article prepared by molding and processing a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

18. A molded article according to claim 17, where the individual polymer segments in the copolymer are capable to micro-phase separation.

19. A molded article according to claim 17 or 18, the molded article being an ion exchanger, an ion adsorbent, a polymeric electrolyte, an ion conductor and a proton conductor.